Gas Laws

- Characteristics of Gases:
  - No fixed shape or volume
  - Relationship between temperature, pressure, and volume holds true for all gases.
- Gas Laws:
  - Boyle's Law
  - Charles's Law
  - Gay-Lussac's Law
  - Combined Gas Law → combines all 3
  - For the first 3, one condition is held constant and two are changed

- Combined Gas Law Equation:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

- Background:
  - Temperature → always use Kelvin
    $K = °C + 273K$
  - Pressure → caused by atoms colliding with container
    → Units: Atmospheres (atm)
    - Closer you are to sea level, the more pressure there is.
    - 1 atm is pressure at sea level
  - Volume → Liters (L)

- Boyle's Law:
  - Constant temperature
  - $P_1V_1 = P_2V_2$
  - If pressure increases, volume decreases (vice versa)
- Charles's Law
  - Pressure constant
  - $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
  - If temperature increases, volume also increases (and vice versa)

- Gay-Lussac's Law
  - Volume constant
  - $\frac{P_1}{T_1} = \frac{P_2}{T_2}$
  - If pressure increases, temperature also increases (and vice versa)

Big Tigers Can Play Golf Violently

→ Boyle's → Temperature

Charles's → Pressure

Gay-Lussac's → Volume